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Ebola Scenario and Template for Hospital Drill  
2014

On October 6<sup>th</sup>, a patient presents to the Emergency Department (ED) looking very ill, doubled over in pain. In the ED waiting room, which is full, the patient vomits once in the bathroom. He notices a sign posted in the ED and tells the ED admitting clerk that he feels very feverish and has recently returned from Liberia. The admitting clerk immediately notifies the ED charge nurse. The ED charge nurse dons hospital-recommended personal protective equipment (PPE)<sup>1</sup> for use with suspect Ebola patients, assists the patient into a wheelchair, and moves him to a private ED room.

Because of concern for Ebola infection, healthcare providers are limited to the charge nurse and one other nurse. The patient is also examined by the ED Attending. All use hospital-recommended PPE. Vitals are: temperature 102.3, blood pressure 98/66, pulse 120. Oxygen saturation on room air is 94%. He reports six days of nausea, vomiting, diarrhea, abdominal pain and chest pain. He has difficulty taking in fluids or solid food. On physical exam, the patient has dry mucous membranes and is confused, oriented to name only. He has diffuse tenderness on abdominal exam and is noted to have bright red blood per rectum.

The decision is made by the ED Attending to limit onsite laboratory testing to point-of-care testing only, which is not immediately available in the ED. Chest X-ray is not performed. An intravenous (IV) line is placed, and the patient is started on normal saline and given 2 grams of ceftriaxone. After the patient receives his first liter of fluid he is reassessed- he remains confused. His blood pressure is 96/64, pulse 125. Arterial Blood Gas (ABG) 7.34/partial pressure of oxygen (pO<sub>2</sub>) 88/partial pressure of carbon dioxide (pCO<sub>2</sub>) 28.

Exposure history:

Because the patient is confused and cannot provide details of his illness, a call is made to his home. His wife is able to provide a detailed history of his recent illness and travel history. The patient visited Liberia for one month to spend time with family. He was not exposed to sick people in Liberia, but on September 28th attended the funeral of an aunt who “may have had symptoms of Ebola”. The patient touched and kissed his aunt’s body prior to burial. There is no history of animal exposure. The patient had taken malaria prophylaxis, but missed two weekly doses. He also received typhoid vaccination prior to travel. He did not intake alcohol, tobacco, use injection drugs, or

had any sexual contacts in Africa. The patient had returned October 1st via Liberia, Belgium and Boston.

The patient works as a bank teller, but has not been back to work since arrival. He lives with his wife, and their 6 year daughter. Neither traveled with him and they are currently both asymptomatic. The daughter is scheduled to start kindergarten in 2 days. The wife notes that the patient had recently visited with his private doctor. A request was made for a copy of that clinic visit dated October 4th, which identified the following:

No other medical history or chronic illnesses.

On October 3rd: Onset of malaise and feeling feverish at home. The patient visited his family doctor on the 4<sup>th</sup> and complained of headache, cough, malaise and fatigue. He was sent home with a diagnosis of a viral syndrome. Laboratory samples were sent and were returned to the physician the next day (October 5<sup>th</sup>) with the following results: white blood cell count 3.0, hematocrit 38 and platelets 120, alanine transaminase (ALT) 50, aspartate transaminase (AST) 68, total bilirubin 0.9, and creatinine 0.6. No malaria smear was done.

#### General Ebola Preparedness Checklist for Healthcare Facilities:

All healthcare facilities should be prepared to safely manage this or a similar scenario of a suspect Ebola patient presenting to their ED. Regardless of whether a facility is able to provide ongoing care for suspect or confirmed Ebola patients, facilities should be prepared at a minimum to safely manage such patients in their ED while awaiting transfer to another facility.

- Has a facility-specific “Ebola suspect” policy and procedure been developed and disseminated to all relevant staff? [e.g., ED, floor/hospitalist, intensive care unit (ICU) staff?]
- Does the facility policy address appropriate PPE, and have PPE supplies been procured in advance and stocked at points needed (e.g., ED triage, outside a designated ED room/floor room/ICU room)?
- Has the facility Infection Preventionist (IP) disseminated information on the recommended PPE to all relevant staff, including instructions for the appropriate sequence for putting on and removing PPE safely?<sup>2</sup> Facilities should hold a training session for relevant staff to review and rehearse appropriate use of PPE.
- Does the facility policy designate patient room(s) or areas in their ED (at a minimum), medical floor and ICU (where applicable), where a suspect Ebola patient would be most safely placed?<sup>3</sup> Has the designated patient care room or area been stocked with appropriate PPE and disposable patient care equipment (e.g., blood pressure cuffs)?

- Does the facility policy address the recommended environmental infection control measures for Ebola<sup>4</sup>, and has this information been disseminated to all environmental services staff? Facilities should consider holding a training session for relevant staff to review these procedures.
- Does the facility policy outline procedures for notifying their Infectious Disease (ID) physician and Infection Preventionist (IP) on call, when a suspect Ebola patient is identified? Does the facility have an incident command structure in place, if needed, and defined thresholds for activation in response to a suspect Ebola patient?
- Does the facility policy outline that the local health jurisdiction (LHJ) should be notified?

Emergency Department Ebola Preparedness Checklist:

- Does the facility have a sign visible in ED waiting room alerting patients and/or family members to immediately report symptoms and history of travel to triage staff?
- Is a protocol in place for managing suspect Ebola patients if they inform ED staff of travel and symptoms (e.g., a plan to isolate patient immediately in a designated separate contained space in the triage area, if the designated ED room isn't immediately available)?
- Is a protocol in place to identify and provide medical evaluation for all hospital staff that had contact with a suspect Ebola patient and were not using recommended PPE (e.g., ED staff, housekeeping staff who cleaned up vomit, etc.)?
- Is a protocol in place to identify potentially exposed patients or visitors (e.g., ED waiting room, persons in admitting area, etc.)?
- Is a protocol in place to decontaminate the waiting room and bathroom?
- Is there a designated room for triage, transport, and clinical staff to quickly don PPE?
- Is there a protocol for a designated staff person to monitor, control and log who is entering and leaving patient's room?
- Is there a protocol for decontaminating the patient's ED room once patient leaves (either transferred to another facility or to hospital floor or ICU)?
- Is there a protocol in place for disposing of all material in ED room (linens, equipment, sharps, etc.)?

**STOP - decision point: should patient be admitted or transported to another institution with appropriate facilities to care for a suspect Ebola case?**

If the decision is made to transfer the patient to another hospital:

- Is there a designated hospital to transfer a suspect Ebola patient to?
- Is there a protocol to manage patient until transfer?

**STOP here if patient will be transferred.**

If the decision is made to admit the patient:

The patient is admitted to a private airborne isolation room with a private bathroom<sup>3,5</sup> on the hospital floor. He already has an IV in and is receiving IV fluids and IV Ceftriaxone, intravenous quinidine and oral doxycycline. The admitting hospitalist consults with the Infectious Disease Attending and orders the following tests: electrocardiogram, two blood cultures, repeat complete blood counts, arterial blood gas, stool cultures with Ova and Parasite testing, serology for rickettsia, typhoid, and malaria smears.

Medical floor and/or ICU Ebola Preparedness Checklist:

Infection control

- Does the facility have a designated room [single bed room or airborne infection isolation rooms (AIIR)] for suspect Ebola patients?
- Does the facility have protocols in place for transporting patient to designated room? (patient, transport personnel, nurses wearing recommended PPE, and sequestering and cleaning and disinfection of patient transport equipment such as wheelchair or gurney)?
- Does the facility have disposable equipment stocked near the designated patient room?
- Is appropriate PPE available outside of the designated room?
- Does the designated room have an anteroom (if available)?
- Does the designated room have a private bathroom (if available)?
- Is appropriate infection control signage displayed outside of the designated room when occupied by a suspect Ebola patient?

- Is protocol in place for removal and disposal as medically regulated waste of all medical waste from the patient room (e.g., linens, disposable PPE, disposable equipment, urine and stool, other bodily fluids)?
- Is protocol in place for decontamination of surface areas and equipment in designated room?
- Is protocol in place for disposal or removal of all medical waste from hospital and by what means? (e.g., autoclave, incineration, outside medical waste company)

### Laboratory

- Is protocol in place to notify hospital laboratory director?
- Has a site specific and procedure specific risk assessment been performed to determine potential risks for specimen handling and processing?
- Are the laboratory director and staff familiar with the recommended biosafety protocols, including PPE?
- Is protocol in place for which laboratory tests are considered “critical” in assessing suspect Ebola patients and how often those tests will be performed?
- Have designated persons been identified to perform blood draws on suspect Ebola patients?

If point of care testing is used:

- Are point of care tests available?
- Have designated persons been identified to perform point of care testing?

If testing is to be performed in hospital laboratory:

- Are the appropriate plastic blood collection tubes available? Glass tubes should not be used. For Ebola virus testing, plastic whole blood collection tubes with ethylenediaminetetraacetic acid (EDTA), SPS, citrate, or clot activator are required.
- Are there designated persons and a protocol in place to transport specimens safely from hospital room to laboratory?
- Will an automated analyzer/machine be used, and if yes, is it being used in a biosafety cabinet or behind a plexiglass shield?
- Has a procedure been developed for decontaminating the analyzer?
- If a biosafety cabinet is available in the laboratory, is there a protocol in place to process blood cultures?

- Is there a protocol in place to inactivate blood specimens to perform malaria smears?
- Is there protocol in place for disposal of laboratory waste (e.g., double bag, wipe down outside of bags with bleach, incineration)?
- Is protocol in place for disposal or removal of all medical waste from hospital laboratory and by what means (e.g., autoclave, incineration, pick up by outside medical waste company)?
- Where will samples from suspect Ebola patients be stored, including labeling as suspected Ebola?
- Are procedures in place to identify and monitor any laboratory personnel who handled the specimens and who were not wearing appropriate PPE?

Sending specimens for Ebola testing:

- Is there a protocol for appropriately packaging and shipping the blood specimen for appropriate testing?
- Have any laboratory staff been trained to perform Category A packaging?
- Has the state public health department contacted the Centers for Disease Control and Prevention (CDC) to determine where specimens for Ebola virus testing should be sent?
- Are personnel familiar with CDC DASH forms for Ebola testing requisition?
- Are appropriate materials available for packaging and shipping samples for Ebola testing as Category A?
- Is there a World Courier account in place to ship samples to testing site?

Media/press issues

- Has a hospital Public Information Officer (PIO) been designated to issue media releases and answer media questions?
- Is PIO officer coordinating with both the local health department and state health department PIO?
- Are media templates in place ready to modify as needed for quick release?
- Is there a mechanism in place to alert and educate hospital staff about the case in the hospital?

**STOP: Proceed if public health department is participating in drill.**

Public Health Responsibilities

- Did the LHJ notify CDPH and their local public laboratory?
- Did hospital representatives (Infectious Disease Attending, IP, Laboratory Director) participate in a conference call with local and state public health to coordinate testing, specimen(s) collection/packaging/mailing, and plan next steps including possible media interest?
- Did CDPH notify and coordinate testing with CDC?
- Did LHJ staff fill out the suspect Ebola case report form and forward to CDPH?
- Did LHJ staff implement close contact identification, follow up, and monitoring? Does the LHJ have a plan on where to triage close contact(s) with fever and/or other symptoms?

Footnotes:

1. CDC infection control guidance recommends *at least* gloves, gown (fluid-resistant or impermeable), eye protection (goggles or face shield), and a facemask, with additional PPE including but not limited to double gloving and shoe/leg covers for situations of copious blood or body fluids in the environment, and respiratory protection (N95 or higher respirator) for use during aerosol-generating procedures. Some healthcare facilities are recommending their staff use such additional PPE including respirators for all Ebola suspect patients, because of the inability to reliably anticipate when copious blood/body fluids might be generated or an aerosol generating event or procedure might occur, and to avoid the need to change or add PPE in the midst of performing patient care.
2. CDC has updated a poster depicting the sequence for putting on and removing personal protective equipment (PPE), available at: <http://www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf>. This updated poster emphasizes guidance to perform hand hygiene *between steps if hands become contaminated*, in addition to immediately after removing all PPE. There are multiple acceptable sequences and methods for removing PPE. Regardless of the sequence or method used, the important principles are that the most contaminated items are removed first, and that the person removing PPE does not contaminate themselves or others during the process. If two pairs of gloves are used, the most contaminated outer gloves can be removed first and the inner gloves last, in order to limit additional contamination of remaining PPE during removal. Performing hand hygiene between steps, and especially prior to removal of a mask or respirator, can help prevent contaminating one's eyes and/or mucous membranes while removing the mask or respirator. Healthcare personnel should familiarize themselves and practice methods of donning and removal of any PPE used, in advance of the time when PPE will be needed.
3. Ideally such room(s) would be a private room with access to a private bathroom (or at least a bathroom that can be made private in the event an Ebola suspect is present) and an anteroom where PPE supplies, hand hygiene, and appropriate waste containers can be located. Some healthcare facilities are designating airborne infection isolation rooms (AIIR) for suspect Ebola patient placement, because many have anterooms, and also to avoid the need to transfer a patient to AIIR in the event of an aerosol generating event or procedure. If a room with an anteroom is unavailable, a suspect Ebola patient can be placed in a room that is spatially separated from other occupied patient rooms in a low traffic area (e.g., at the end of a hallway), with a designated area for hand hygiene and waste containers outside the room and separate from other patient care areas.
4. CDC has issued Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus, available at: <http://www.cdc.gov/vhf/ebola/hcp/environmental-infection-control-in-hospitals.html>. Disinfection products with higher potency than what is normally required for an enveloped virus such as Ebola are recommended

and include Environmental Protection Agency-registered hospital disinfectants *with a label claim for a non-enveloped virus* (e.g., norovirus, rotavirus, adenovirus, poliovirus), as well as bleach solution. In addition, the guidance recommends that porous surfaces that cannot be made single use (e.g., carpeting, upholstered furniture and curtains) be avoided in rooms of suspect Ebola virus disease (EVD) patients, and that potentially contaminated textiles (e.g. linens, non-fluid-impermeable pillows or mattresses, and privacy curtains) be *discarded as regulated medical waste*.

5. If a private toilet is unavailable, as in most ICU rooms, or for critically ill patients unable to use a toilet, a dedicated commode and/or disposable bedpan can be used, and the contents solidified with high-absorbency gel and decontaminated with effective disinfectant prior to disposal as medically regulated waste.

Local Health Jurisdictions and Hospital should be familiar with the following CDC guidances, available at: <http://www.cdc.gov/vhf/ebola/hcp/index.html>:

#### Diagnosis/Testing

- Case Definition for Ebola Virus Disease (EVD)
- Ebola Virus Disease Information for Clinicians in U.S. Healthcare Settings
- Ebola Screening Criteria Template for Hospitals

#### Infection Control

- Sequence for Putting On and Removing Personal Protective Equipment (PPE)
- Tools for Protecting Healthcare Personnel
- Safe Management of Patients with Ebola Virus Disease (EVD) in U.S. Hospitals
- Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals
- Guidance for Safe Handling of Human Remains of Ebola Patients in U. S. Hospitals and Mortuaries
- Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus

#### Specimen Collection, Transport, Testing, and Submission

- Factsheet: Interim Guidance for Specimen Collection, Transport, Testing, and Submission for Patients with Suspected Infection with Ebola Virus Disease
- Interim Guidance for Specimen Collection, Transport, Testing, and Submission for Persons Under Investigation for Ebola Virus Disease in the United States

#### Packaging and Shipping Clinical Specimens Diagram

- Interim Guidance Regarding Compliance with Select Agent Regulations for Laboratories Handling Patient Specimens that are Known or Suspected to Contain Ebola Virus

#### Transportation/Monitoring/Movement

- Interim Guidance for Monitoring and Movement of Persons with Ebola Virus Disease Exposure
- Interim Guidance for Emergency Medical Services (EMS) Systems and 9-1-1 Public Safety Answering Points (PSAPs) for Management of Patients with Known or Suspected Ebola Virus Disease in the United States

#### Hospital Preparedness

- Detailed Hospital Checklist for Ebola Preparedness
- Health Care Facility Preparedness Checklist for Ebola Virus Disease (EVD)
- Health Care Provider Preparedness Checklist for Ebola Virus Disease